The intensity of sound wave A is 800 times that of sound wave B at a fixed point from both sources. If the sound level of sound A is 110 dB, what is the sound level of wave B?

$$\beta_A = 10 \log \frac{I_A}{I_0}$$

$$\beta_B = 10 \log \frac{I_B}{I_0}$$

$$\beta_B - \beta_A = 10 \log \frac{I_B}{I_0} - 10 \log \frac{I_A}{I_0}$$

$$= 10 \left(\log \frac{I_B}{I_0} - \log \frac{I_A}{I_0} \right)$$

$$= 10 \log \frac{I_B}{\cancel{I_0}} \cdot \frac{\cancel{I_0}}{I_A}$$

$$= 10 \log \frac{I_B}{I_A}$$

$$\beta_B = \beta_A + 10 \log \frac{I_B}{I_A}$$ ← $I_A = 800 I_B$

$$= 110 + 10 \log \frac{1}{800} = 81 \text{ dB}.$$